

ABSTRACT

A method for making metal-insulator-metal (MIM) capacitors having insulators with high-dielectric-constant and sandwiched between wide-band-gap insulators resulting in low leakage currents and high capacitance per unit area is achieved. The high-k layer increases the capacitance per unit area for next generation mixed-signal devices while the wide-band-gap insulators reduce leakage currents. In a second embodiment, a multilayer of different high-k materials is formed between the wide-band-gap insulators to substantially increase the capacitance per unit area. The layer materials and thicknesses are optimized to reduce the nonlinear capacitance dependence on voltage.